



CDFW Comments
on Preliminary Draft
California Water Plan Update 2018
Version 9/27/2017

October 15th, 2017

The State of California Department of Fish and Wildlife (CDFW) appreciates the opportunity to review the Preliminary Draft of the California Water Plan Update 2018 dated 9/27/2017 (the Draft).

The following seven different organizational units under CDFW have reviewed the Draft:

Fisheries Branch (**FB**)
Habitat Conservation Planning Branch (**HCPB**)
Water Branch (**WB**)
Watershed Restoration Grant Branch (**WRGB**)
Wildlife Branch (**WLB**)
California State Wildlife Action Plan Program (**SWAP**)
Climate Science Program (**CS**)

To indicate the origin of the comments, acronyms of the unit names, as defined in **bold font** above, has been inserted at the end of each comment.

We are truly looking forward to explore near-future and long-lasting collaboration opportunities with DWR for a sustainable future, through advancing alignment between the coming Water Plan and our various programs. Please let us know if we could be of any help, including addressing inquiries for provided comments, either through myself, at the address, phone, or email in the letterhead, or Junko Hoshi, (916) 539-9892, (junko.hoshi@wildlife.ca.gov).

Sincerely,

Scott Cantrell
Chief, Water Branch
CA Department of Fish and Wildlife
Scott.Cantrell@wildlife.ca.gov

COMMENTS

ALL CHAPTERS

1. Overall, the tenor appears reasonable in terms of existing ecological status, funding allocations to environment, and suggested steps to move forward for a more sustainable outcome. (HCPB)
2. Responses to the Reviewer's Guide All Chapter Accessibility Question No.3 **"Please highlight any areas of text (include page numbers) you find confusing or in need of additional explanation."**

Comments: The concept of "dynamic balancing" is used without any explanation. I think I understand the concept to be about the relative importance of the four identified societal values, and how the relative importance (or the values themselves, I'm unclear?) change over time. If it's the latter, it implies that there is an existing hierarchy among the societal values, which I don't think is true. My hierarchy is likely not the same as my neighbor or someone who lives in a different area of the State. I guess I just don't see the value added by this concept of dynamic balancing, only added confusion, for me. (FB)

Comments: I also don't think it's great that the operational definition of 'sustainability' (or the vision) is drawn out over the first two chapters. I suggest a more straight-forward approach. (FB)

3. Responses to the Reviewer's Guide All Chapter Inspiration and Motivation Question No.1 **"The authors wish to inspire and motivate. What advice would you offer to help them in achieving that goal?"**

Comments: The document would have been more inspiring if it addressed/explained how a sustainable water management approach was going to ensure the preservation of vitality from each watershed or hydrological unit that water was being delivered from. (FB)

Comments: It would also be more inspiring if there was a call to action for me. As a Californian, what I can do to help achieve sustainability. There is this undertone of 'we are all in this together' but it would be more inspiring if it was an overtone, and not an undertone. (FB)

CHAPTER 1 Envisioning Water Resources Sustainability

Page 1-1 “two extremes”

Comments: What are the two extremes? Explain a bit more what you mean by this. (WLB)

Page 1-1 “consequences of recurring extreme events have been experienced”

Comments: Awkward. What does "extreme events" mean - drought? floods? both? And either expand on what the consequences are, or just say that recurring events have happened. (WLB)

Page 1-2 Paragraph starting with “Even with these important initiatives...”

Comments: This paragraph feels a little redundant. Either don't use lists in the first couple sentences, or only use those lists (rather than expanding the details in the second half of the paragraph). (WLB)

Page 1-2 “Many of California’s ecosystems are dysfunctional”

Comments: This contradicts your statement in the very first paragraph about thriving ecosystems - maybe say "have become dysfunctional" instead? (WLB)

Page 1-3 “Sustainability should become the goal of every Californian because we all benefit from the state’s natural resources.”

Comments: Delete this sentence - it's true, but sounds too much like a lecture from the "treehugging" camp. Alternately, leave it in, but articulate in more detail how EVERYONE benefits from natural resources. (WLB)

Page 1-3 “collaboration among State, federal, tribal, and local agencies”

Comments: The term "stakeholders" might be a better word, because it's not just government agencies that should be engaged in the process. (WLB)

Page 1-5 “four societal values”

Comments: Are these the four things listed under what the future will look like? Be consistent in how you refer to them, or format the original list as a numbered and titled set of values. (WLB)

Page 1-5 “Sufficient and stable funding is required...”

Comments: The funding issue can't be over-emphasized enough. None of the rest of this plan can be implemented without adequate funding, so be emphatic that this is ultimately the weakest link in the chain. (WLB)

Page 1-5 “probability”

Comments: What does this mean? (WLB)

Page 1-5 Two sentences starting with “This includes investing in improvements...”

Comments: These two sentences are redundant. (WLB)

Page 1-5 “The goal is more cost-effective and successful delivery of intended benefits and services.”

Comments: Awkward sentence. (WLB)

Page 1-5 “while protecting the societal value...”

Comments: Are you referring to the "four societal values" again, or just societal values in general? (WLB)

Page 1-5 “Taking a long-term view”

Comments: Consider emphasizing the importance of addressing climate change here, in the context of this paragraph on taking a long-term view. Failing to consider projected changes in climate and/or failure to implement adaptable management practices will greatly decrease likelihood of achieving sustainable water management. (CS)

Page 1-5 “green and grey”

Comments: Define and/or provide examples of green and grey infrastructure. (CS)

CHAPTER 2 Sustainability Outlook

1. Responses to the question in the Reviewer’s Guide Chapter 2 **“One goal of the Chapter is to make the case for adopting a water management sustainability approach. How well did the text achieve this goal?”**

Comments: Somewhat, not overwhelmingly. I thought that the treatment of foundational and critical challenges (pages 2-5 – 2-8) was the most clearly

articulated and thought-out portion of the chapter. For me, it provided the best foundation for framing the need to adopt a sustainability outlook approach. (FB)

2. Responses to the question in the Reviewer's Guide Chapter 2 **"To what extent does this chapter characterize the foundational issues and challenges that you and your communities face?"**

Comments: There is a bullet under 'critical challenges' for 'Increased demands for water' but this is written strictly from a human-use point of view only. Perhaps another critical challenge that should be included would be an increased demand for environmental water. (FB)

3. Responses to the question in the Reviewer's Guide Chapter 2 **"What would you add, subtract or change to improve the chapter?"**

Comments: Page 2-9; All four bullets under the Healthy Economy Societal Value could be more clearly articulated. (FB)

Comments: Because the indicators are going to be so vital in assessing whether or we are achieving sustainability, as defined by the Sustainability Outlook, it seems like it would be prudent to list the set of indicators that apply stateside and provide an example of how those can be modified for conducting watershed-scale sustainability assessments/outlooks. Maybe there are a large number of statewide indicators (I don't know because this wasn't addressed), so you could include the top 10 or something? Without any indication of how many and what types of indicators are being addressed (e.g. regulatory, administrative, environmental, governance, etc.) it's hard to tell where the priorities are. I think that would be a good addition to the chapter. (FB)

Page 2-1

Comments: This section observes that continued public motivation and engagement in water sustainability issues is important and that people need to have a good understanding of how their efforts matter and fit into the big picture. This is an important theme that comes up throughout Chapters 2-3. (WB)

Page 2-1

Comments: Another important theme that comes up throughout Chapters 2-3 is a focus on regional, watershed scale planning efforts as the primary venue to identify sustainability needs and solutions. This is consistent with the approach advocated by

the Delta Conservation Framework, to emphasize the role of state agencies as long-term large-scale coordinators of more specific focused regional efforts. (WB)

Page 2-2 “Although a considerable amount of water is dedicated to the maintenance and restoration of aquatic and riparian ecosystems, environmental needs are not always met.”

Comments: Suggest re-phrasing this sentence to acknowledge that regulatory requirements to benefit the environment are not always met, and this is also part of the reason why ecosystems and the species that depend upon them, continue to decline.

“Although a considerable amount of water is required to be dedicated to the maintenance and restoration of aquatic and riparian ecosystems, it is not always available and environmental needs are not ~~always met~~ as a result.” (WB)

Page 2-2 and 3 “in responding to changing habitat and flows,”

Comments: Climate change will exacerbate these risks and issues in the long-term, and native species may be disproportionately affected (Moyle et al. 2012).

Moyle, Peter B., Rebecca M. Quiñones, and Joseph D. Kiernan (University of California, Davis). 2012. Effects of Climate Change on the Inland Fishes of California: With Emphasis on the San Francisco Estuary Region. California Energy Commission. Publication number: CEC-500-2012-029. (CS)

Page 2-3 “Water Quality.”

Comments: Wildfire risks (and projected increases in average annual area burned) are not mentioned in the document. Consider adding reference here to wildfire and associated impacts to water quality. (CS)

Page 2-6 “Regulatory Framework:”

Comments: This section, as currently phrased, captures only part of the puzzle regarding the requirements and needs for regulation of water in California. It voices a very commonly heard frustration with complex permitting processes. However it doesn’t acknowledge the importance of regulatory processes in ensuring that checks and balances are in place to evaluate water use among users (including the economy, communities and the environment). I suggest rephrasing this section to highlight both the goals of regulation and potential pitfalls with the current system that was founded on those important goals. (WB)

Page 2-8 “Declining ecological conditions:”

Comments: I suggest rechecking this subsection and adding additional citations and detail to support the inference that five species have gone extinct in California as a result of water availability issues since 1980. (WB)

Page 2-8 “Declining ecological conditions:”

Comments: And many of these species and habitats are especially vulnerable to climate change, which should be considered in the context of long-term sustainability.

Habitat vulnerability reference: Thorne, J.H., R.M. Boynton, A.J. Holguin, J.A.E. Stewart, & J. Bjorkman. (2016)
A climate change vulnerability assessment of California’s terrestrial vegetation.
California Department of Fish and Wildlife (CDFW), Sacramento, CA.
(CS)

Page 2-8

Comments: I suggest a fact check on the following item on page 2-8: Declining ecological conditions: Even with the recent focus on the connection between water and ecosystem health, much habitat remains disconnected from water supplies. Native species continue to decline. More than 150 individual species are listed as threatened or endangered in California, and five have become extinct since 1980. Several currently on the brink of extinction. (California Department of Fish and Wildlife 2016) (HCPB)

Page 2-9 “Ecosystem Vitality”

Comments: Suggest cutting the “in harmony with predicted economic activity and human population increases”. This phrase limits the intrinsic value of ecosystem viability by tying it to other values. The other values in this section are presented as stand-alone topics. (WB)

Page 2-9 “Ecosystem Vitality”

Comments: It might be beneficial to include a brief description of the benefits of healthy ecosystems to humans (e.g. air quality, recreational opportunities, water filtration, etc.) to help the reader understand why ecosystem vitality is so important and why it is integrated into this plan. Consider adding one or two sentences on this topic towards the beginning of the document where ecosystem vitality is first mentioned. (CS)

Page 2-9

Comments: I suggest adding a bullet (in red):

The Four Societal Values Using the Sustainability Outlook, Californians can effectively support sustainability in a coordinated, integrated way toward the following outcomes, as aligned with the four societal values:

- Ecosystem Vitality

- Preserved or enhanced biodiversity throughout the state.
- **Resilient and sustained** high-quality natural resources and habitats in harmony with predicted economic activity, **and** human population increases, **and climate-change effects**. (HCPB)

Page 2-9 and 10 “Sustainability Outlook”

Comments: The emphasis on long-term, large-scale planning based on science is a strength of this section and consistent with other planning documents produced by CDFW. (WB)

Page 2-11 Sustainability Outlook Figure

Comments: I suggest making the colors for each of the values more distinct, they are a bit difficult to differentiate. (WB)

Page 2-12

Comments: Again, we support the focus on watershed scale approaches to evaluation, communication and planning. (WB)

CHAPTER 3 Action for Sustainability

1. Responses to the question in the Reviewer’s Guide Chapter 3 “To what extent are the needs of your community addressed in the recommendations?”

Comments: Potential opportunities to leverage green infrastructure is under-represented in the recommendations/prioritized actions. For instance, the Statewide Green Infrastructure and Working Landscapes task force has a shelf life of 2 years and a budget of less than \$ 2M. They develop a report, and then disband. Wouldn’t it be more “sustainable” to monitor progress and effort on this action to see if outcomes were achieved and how they may need to be adaptively managed? (FB)

2. Responses to the question in the Reviewer’s Guide Chapter 3 “To what extent do believe the recommendations adequately address the foundational challenges identified in Chapter 2?”

Comments: I think there is suitable overlap between the identified challenges and the recommendations. (FB)

Page 3-2 “Improve Regulatory Framework to Reconcile Environmental Needs and Human Activities”

Comments: I am having a hard time envisioning the deliverable requested in this section. Is it advocating for an entirely new set regulatory authorities and tools? Or, a new supra-regulatory structure to oversee and coordinate current processes run by individual local, state and federal entities? Either of these options doesn't seem to lead to improved efficiency or simplicity in permitting. (WB)

Page 3-2 "Recommended Actions"

Comments: Add words in red as below.

Improve Regulatory Framework to Reconcile Environmental Needs and Human Activities — Managing water resources for sustainability will require a regulatory framework designed to support achievement of the four societal values; tied to and informed by regional/watershed planning and implementation efforts, including active planning and investing to enhance ecosystem function and viability; based on an ecosystem **conservation and** reconciliation approach; and tailored for different locations. (HCPB)

Page 3-2 “Recommended Actions”, in the second bulleted recommendation the authors use the term **“ecosystem reconciliation”**

Comment: “Ecosystem reconciliation” is a recent concept. CDFW recommends that DWR provide a clear definition for “Ecosystem reconciliation”. According to Rosenzweig (2003), “Reserving small tracts of wild habitat can only delay these [species] reductions. But we can stop most of them by redesigning anthropogenic habitats so that their use is compatible with use by a broad array of other species.” Grimm and Lund (2016) stated, “Reconciliation ecology recognizes this limitation [levees, dams, and existing development], and encourages instead the re-engineering of human dominated landscapes to allow for coexistence of native species and human uses.” In both cases, there is the recognition that human landscapes can be managed for biodiversity and benefits to humans, but it is futile to try to recreate historical landscapes in these highly altered landscapes. Furthermore, CDFW agrees that land managers need to customize their actions to the limitations and opportunities that each location presents. (WRGB)

Page 3-3 “State-Agency Alignment.”

Comments: This section, as currently phrased, verges on a negative tone that may not be constructive during implementation. Instead, I suggest shifting the wording to discuss the benefits of asking agencies to work together and form multi-disciplinary collaborations across their respective areas of expertise. These multi-disciplinary

discussions would serve to strengthen our understanding of sustainability, the societal values laid out in this plan, and forge creative paths forward. (WB)

Page 3-3 “Strengthen the alignment of government planning, processes, and tools...”

Comments: The emphasis in this section on “holistic watershed scale goals, objectives and actions” is a strength. I also appreciate the call for developing holistic watershed scale plans to eliminate the need for larger state-required plans. In our public outreach we have consistently heard requests for fewer individual plans, and considering factors as a part of big questions, like water sustainability, side-by-side. (WB)

Page 3-4 “Programmatic Environmental Compliance Task Force.”

Comment: CDFW agrees with the DWR’s view that programmatic environmental compliance would quicken the process of implementing desired projects. However, it is very difficult for a task force to create a programmatic permit that covers all potential project types and all potential State, federal, and local permits. The task force would likely achieve more success if they developed programmatic permits designed for specific project types or suite of project types that share similar environmental compliance needs. (WRGB)

Comments: Please see comments on Page 3-2 above. In addition to these comments I am concerned that the suggestion to “Improve existing tools and processes” is not well founded. At the beginning of our outreach process to hear stakeholder frustrations about planning and implementing conservation we frequently heard this comment. However, after further discussion it became clear that “existing permitting tools” are not actually the limiting factor. Instead, the regulatory agencies and project proponents acknowledged that 1) a lack of resources at regulatory agencies dedicated to permitting conservation projects in specific regions and 2) a lack of facilitated communication and coordination among project proponents and regulatory agencies were the primary limiting factors. Subsequent research shows that there are already regulatory tools available that could substantially improve the efficiency of permitting processes if sufficient resources and coordination are available.

I suggest shifting the focus of this bullet point and subsequent sections including “Ecosystem Restoration Project Permitting”, “Delegation of Federal Permitting” and “Cooperative Agreements” which are likely to further complicate and delay permitting processes, instead of making them more efficient. They miss the underlying reasons behind regulatory delays, a lack of resources and consistent coordination and communication. Additionally, their current phrasing does not use a constructive tone. (WB)

Page 3-4 and 5 “Improve Regulatory Framework to Reconcile Environmental Needs and Human Activities...” Rephrase as below:

- Reduce impediments to project implementation and transactional costs caused by regulations and processes.
- Tie and consolidate regulations and permitting processes to **ecoregional and watershed scale planning, implementation efforts, and long-term system management for sustainability, which should include active planning and investment to enhance ecosystem function, ~~and~~ viability, biodiversity, and resilience to pressures and stressors, including climate change.**
- **Support existing regional conservation and regulatory tools, and** improve existing tools and processes to address common challenges and concerns with the current regulatory framework to streamline the permitting process and move beyond traditional project-by-project mitigation. Other ideas to consider include delegation of regulatory authorities and consolidation of permitting efforts and responsibilities.
- Consider changes to allow **more** regionally focused approaches to regulation and investments for ecosystem reconciliation. Identify options that allow State and federal regulators to rethink and experiment with more holistic and place-based approaches.
(HCPB)

Page 3-5 “Tie and consolidate regulations and permitting processes to watershed scale...”

Comment: CDFW agrees that watershed scale planning is needed. However, the term “watershed” could mean the entire Sacramento-San Joaquin Watershed. Perhaps it would be better to develop permits for specific watershed units as defined under USGS hydrologic classification system, e.g. “subregion” level in the USGS classification system (i.e., hydrologic unit code (HUC) 4). (WRGB)

Page 3-5 “Consider changes to allow regionally focused approaches to regulation and investments for ecosystem reconciliation. Identify options that allow State and federal regulators to rethink and experiment with more holistic and place-based approaches.”

Comment: CDFW supports the development of local solutions and welcomes testing of experimental approaches but implementing large-scale or watershed scale experiments can lead to costly failures or at the very least may be a poor investment of limited funds. To assist further CDFW’s review of this point, please elaborate on the type of changes that would allow regionally focused approaches to regulations. (WRGB)

Page 3-5 “Ecosystem Restoration Project Permitting”, directs the “California Department of Fish and Wildlife should evaluate permitting processes for ecosystem restoration and enhancement projects and make recommendations on potential statutory alterations to mitigation requirements for restoration projects. The evaluation should include a determination whether permitting for restoration

projects could be considered on a separate track that allows credit for the restoration components of projects. Considerations should also include exempting projects that include a restoration component from additional mitigation requirements necessitated by the impacts of that restoration component.”

Comment 1: If project proponents contact CDFW during the planning phase, they should be able to obtain permits in a timely manner. The problem with the timeliness of permits often results from this lack of communication. The State could alleviate this problem by creating a resource site (i.e. website) where project proponents can visit that provides guidance regarding potential permits. The site should also have an updated list of contacts that are required to respond to information requests and provide permit support. The State could further aid the process by dedicated sufficient funds to all permitting agencies that provide dedicated support to restoration project. (WRGB)

Comment 2: Mitigation requirements survey a necessary purpose. CDFW supports the restoration of habitats, but CDFW cannot ignore the loss of another species habitat that may be a consequence of the project. If possible, the project proponents should preserve existing habitat on site. However, if they cannot protect existing habitat they should mitigate, as any other entity would be required to do. Watershed planning, as well as other regional planning such as Natural Community Conservation Planning could alleviate the challenges faced by restoration planners. (WRGB)

Comment 3: There are existing exemptions in California Environmental Quality Act (CEQA) for “Small Habitat Restoration Projects” (14 CCR § 15333). This exemption is for projects that do not exceed five acres in size to assure the maintenance, restoration, enhancement, or protection of habitat for fish, plants, or wildlife The State should consider increasing the exempt acreage. (WRGB)

Page 3-5 “Improve existing tools and processes to address common challenges and concerns regarding current regulatory framework. - Ecosystem Restoration Project Permitting.”

Comments: Add the phrase in red as below.

The California Department of Fish and Wildlife should evaluate permitting processes for ecosystem restoration and enhancement projects and make recommendations on potential statutory alterations to mitigation requirements for restoration projects. The evaluation should include a determination whether permitting for restoration projects could be considered on a separate track that allows credit for the restoration components of projects, **such as by including them in regional conservation plans or strategies to develop mitigation credit agreements**. Considerations should also include exempting projects that include a restoration component from additional mitigation requirements necessitated by the impacts of that restoration component. (HCPB)

Page 3-5 “Delegation of Federal Permitting.”

Comment: Caltrans receives federal funding and the Federal Highway Administration has delegated certain authorities to Caltrans. Where other State and Federal partnerships exist, it is possible that such delegations of authority will be possible. Outside of such partnerships, it is unlikely that federal government would delegate their authority. (WRGB)

Page 3-5 “Cooperative Agreements.”

Comment: CDFW supports cooperation among agencies. However, it is unlikely that the State would “reduce the number of regulatory agencies” without of a major restructuring of State agencies and laws. A one-stop site for State permits would be helpful to project proponents. In addition if the site provided information on other local and Federal permits, and it would also be helpful to have staff available to respond to questions. (WRGB)

Page 3-6 “Use best available science, data, tools, traditional ecological knowledge...”

Comments: What does “traditional ecological knowledge” refer to? Suggest replacing this with “current scientific understanding of ecosystem function”. (WB)

Page 3-6 “Climate Science and Monitoring Program”

Comments: “Changing Snowpack” – Consider deleting "changing snowpack" from the end of this sentence. Changes in snowpack will still occur in the absence of extreme events. (CS)

Comments: “should be funded by this program” - Add changes in streamflow (e.g. timing and magnitude of peak flows) and stream temperature. (CS)

Page 3-6 “Comprehensive Water Resources Data Collection and Management Program.”

Comment: Presently much of the ecosystem monitoring consists of various entities monitoring specific projects. The entities that implement those projects are the primary source of funds for said monitoring. Those funds usually cover only a limited term monitoring. Even programs that carry out long-term monitoring often struggle year to year to find adequate funding. Currently there are many separate repositories for resource data, which various entities manage. The funding for these databases fluctuates and is often tenuous. Therefore, CDFW supports the development of a jointly managed comprehensive resources data collection and management program (as called for in Assembly Bill 1755, California Water Code section 12410) along with the

development of secure funding sources not only for the program but also for the efforts of the various entities that collect, compile, and uploaded data. (WRGB)

Page 3-7 “Thematic Plans and Plan Alignment.”

Comments: Previous sections emphasized the need to focus on regional and watershed scale planning in an effort to reduce the number of plans needed to achieve sustainability. These suggestions for additional plans seem to run counter to that goal. Suggest including these “themes” as elements of regional scale plans and then summarizing in the regular water plan update, instead of creating new intermediary planning steps. (WB)

Page 3-9 “Strengthen regional integrated water management planning, track program performance, and report intended...”

Comments: What is the intended audience for this tracking and reporting feature? What will the intended audience do with the information? I suggest linking tracking and reporting requirements to high level adaptive management processes, possibly integrated into the next water plan update as recommendations, to put all of this information to good use over the long term.

We support the idea to make state funding programs more consistent. We have also strived to make terminology in grant solicitations consistent to help applicants understand what is expected of them and prepare strong proposals. (WB)

Page 3-12 “Promote the use of vegetation, soils, and other elements and land use practices...”

Comments: We support this emphasis on bolstering ecosystem services as long-term, and cost effective, way to enhance water management and environmental uses. (WB)

CHAPTER 4 Investing in Water Resources Sustainability

1. Responses to the Reviewer’s Guide Chapter 4 “The narrative and numbers in this draft...The flow of information will be more streamlined as follows:

Comments: “Considerations that Guide Funding Recommendations”: There is a lot of detail relative to a) how different types of funding mechanisms affect management decisions, b) how shifting priorities impact when and what management actions are funded, and c) how cost shares impact management actions. This material could be located in supporting documentation, but I wouldn’t burden the reader with these details unless the plan is to seek input on which novel funding mechanisms are most appropriate. (FB)

2. Responses to the question in the Reviewer's Guide Chapter 4 "What do you believe should be the emphasis of this chapter?"

Comments: Where the money is going to come from (i.e. what is the varied, expansive and novel portfolio of funding mechanisms that will be used to encumber the \$270 billion funding need identified for the 50-year planning cycle. (FB)

CHAPTER 5 Funding and Implementation Plan

CITATIONS

Rosenzweig, M. (2003). Reconciliation ecology and the future of species diversity. *Oryx*, 37(2), 194-205.

Suddeth Grimm, Robyn; & Lund, Jay R. (2016). Multi-Purpose Optimization for Reconciliation Ecology on an Engineered Floodplain: Yolo Bypass, California. *San Francisco Estuary and Watershed Science*, 14(1).